
ENVIRONMENTAL Fact Sheet



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2005

Considerations When Purchasing Water Treatment Equipment

WATER QUALITY TESTING

Prior to selecting a water treatment device, the Department of Environmental Services recommends that the water quality of your well be tested for important contaminants common to your well type and your region of New Hampshire. Some drinking water contaminants have taste, odor, or color characteristics that make their presence known without laboratory testing. However, many health related contaminants found in drinking water in New Hampshire, such as bacteria, radioactivity, arsenic and fuels and industrial solvents, exhibit none of these simple taste and odor indicators. The presence of these contaminants and most others that pose a health risk can only be determined by laboratory testing.

The "standard analysis" offered by the DES Laboratory provides testing for 13 water quality factors at low cost. This initial analysis answers many questions but leaves some health related contaminants common to New Hampshire untested. For bedrock wells, these additional factors include beryllium, mineral radioactivity (partially identified by the analytical gross alpha test), radon gas and volatile organic chemicals (VOCs).

Laboratory test services are also available from independent laboratories, which are listed in the Yellow Pages under such listing as: "Laboratories" and "Water Analysis." If water laboratories are not listed, try calling well drillers, pump installers or water treatment firms for laboratory referrals.

For both bedrock and dug wells, it is also advisable to examine the land uses uphill of and adjacent to the well being tested to determine if additional testing is necessary for contaminants such as pesticides or herbicides. (See the discussion in fact sheet WD-WSEB-2-1 concerning recommended water quality testing for private wells.)

CONSISTENCY OF WATER QUALITY

The quality of groundwater can fluctuate. Such variation is important in sizing a treatment device. For **naturally** occurring contaminants, the chemical make-up of the water, including the **number of chemical contaminants present**, is fairly stable. However, the **concentration of each contaminant** can fluctuate due to such factors as the length of prior pumping, height of groundwater table, previous rainfall timing and amount, season of the year and other factors. These variables may increase certain contaminants concentrations in one well while diluting that contaminant in another well.

For **manmade** contaminants, the concentration of each may not be stable. The contaminant concentration may increase or decrease substantially over time and the number and type of

contaminants may also vary. These variations will depend on the size and movement direction of the contaminant plume as it moves down hill.

We recommend at least two water quality tests be taken over a period of months before finalizing the selection of water treatment equipment. Before purchasing treatment equipment we recommend a complete water quality test be done as recommended in fact sheet WD-WSEB-2-1. If there are multiple contaminants, they should be put in priority order by health risk in evaluating treatment types and cost.

SIZE OF TREATMENT EQUIPMENT

Water treatment devices come in two basic sizes: "point-of-use" or "whole-house." Each type is explained below. The nature of the contaminant dictates which type of treatment should be used. The concentration of the contaminant(s) and water volume needs to be determined to the relative size the treatment device.

Point-of-use devices are typically installed near the kitchen and treat only a few gallons of water per day. The purified water is taken from an extra faucet installed at a location of your choice, typically at the kitchen sink. Such a system might be used for such contaminants as arsenic, beryllium, fluoride, uranium, nitrate or radium where only the water to be directly consumed or used for cooking generally needs to be treated. Reverse osmosis (RO) is a commonly selected point-of-use device. RO treatment is explained in fact sheet WD-WSEB-2-11.

Whole-house devices typically treat **all** water used **within** the home, about 100-300 gallons per day depending on family size. This size treatment device might be used for such contaminants as odor, iron, hardness, manganese and radon gas.

Outside Water Use. Outside water faucets generally do not need treatment. The exception is swimming pool filling typically requires low levels of iron/ manganese. Needlessly treating outside water increases the capital and operational costs of treatment.

IDENTIFYING TREATMENT OPTIONS

It is good practice for consumers to request information and study each proposed alternative treatment method before purchase. Request information from at least two different water conditioning firms. Asking the following questions will help you make the best selection:

- What is the recommended generic treatment method (not just the marketing name of the device)?
- What are the technical principle(s) governing the process?
- What other treatment options are available?
- If funds are limited, can plumbing connections be installed for the addition of future treatment devices?
- Why were the other treatment options not recommended?
- Which type of equipment and treatment options do your neighbors or co-workers use if they have the same problem with their water supplies?

When choosing a treatment device, identify the following:

- Understand the chemical or physical principles used by the treatment device.
- Understand how raw water quality changes can affect the device efficiency.
- Identify any disadvantages inherent to the proposed treatment approach.
- What chemicals does the treatment add to the water?

- What desirable chemical(s) does the treatment process inadvertently take out?
- Where do the waste products go?
- Does the raw water require any preconditioning steps?
- What factors would cause this treatment process to malfunction and how would these factors or malfunctions be detected?
- What maintenance procedures are necessary for efficient operation of the treatment process?

LICENSED TREATMENT DEVICES AND INSTALLERS

Many private well owners treat their wells to improve water quality. The State of New Hampshire does not approve water treatment devices or specific equipment brands. In 2003, legislation was passed to develop a voluntary certification program for installers of water conditioning devices. This certification program will focus on ensuring proper plumbing of treatment devices rather than contaminant evaluation and equipment sufficiency. This installer certification program is expected to be functional by the late spring of 2006.

Ensure the proper plumbing configuration at both the connection with the potable **water** system and the **sewer** system. Such plumbing should be reviewed for consistent with the 2000 International Plumbing Code. In particular, ensure that there is an "air gap" and trap where the backwash water from the treatment device discharges into the sewer plumbing.

There is a state licensing program for water well drillers and water pump installers. There is also a state program that certifies laboratories that perform compliance testing for **public** water systems. Laboratories are not required to be certified for testing water samples from private wells.

CHOOSING A FIRM. DEFINING THE WORK

There are typically four cost/guarantee options associated with obtaining water treatment equipment:

- a. Purchase new equipment and have the selection and the equipment installed and guaranteed by others.
- b. Purchase new equipment and install it yourself; only the equipment is guaranteed typically by the manufacturer.
- c. Purchase used equipment and install it yourself; typically there are no guarantees for used equipment and installation is do-it-yourself.
- d. Rent the equipment and have it installed and guaranteed by others.

In choosing a firm for purchase of services or equipment, you could evaluate their stability by determining how long the firm has been in business and the size of their operation. We suggest choosing a firm within 30 to 50 miles of your home to facilitate follow-up service. Also, call the Better Business Bureau of New Hampshire, (603) 224-1991, for their comments. Ask the water treatment firm to provide references of other local customers, and possibly call some.

Identify the guarantee and the level of "after sale" service provided. If the company recommends the treatment method and installs the equipment, the contact agreement should recognize that you are buying a **solution** to the contaminant problem and **not just a particular piece of equipment**. Finally, specify in advance, a satisfactory level(s) of treatment performance desire typically identifying the contaminant(s) of concern and either the percent removal or "not-to-

exceed" treated contaminant concentration. Identify the precise policy for payment and any "hold back" during the agreed upon trial performance period.

Do not purchase a water treatment system under the stress of such conditions as "limited time offer," "we just happen to be in your neighborhood," or there is "pollution in your neighborhood." Similarly do not purchase equipment based only on water quality testing done at your kitchen table since such testing is usually for contaminants of little health importance. Many minerals exist in drinking water that can be identified by such simple kitchen table tests that present no health risk and, in fact, may even be beneficial.

Ask for a copy of the contract prior to signing. Identify precisely the piping, valves and equipment to be provided. Identify precisely what will not be covered. Also identify what spare parts and instruction documents which will be provided with the equipment. Clearly identify both the **purchase cost** and the **projected annual operational cost** for your family's typical water demand.

DESIGN AND INSTALLATION OF THE TREATMENT EQUIPMENT

Some considerations when laying out water treatment equipment include:

1. Provide a permanent gated by-pass of the treatment device for any outside water faucets.
2. For a "whole house" treatment, have a plumbing by-pass to allow convenient repair of the treatment device. A by-pass may be inappropriate where bacteria are present in the water; and where the use of the by-pass could leave residual bacterial contamination in your plumbing even after the by-pass has been closed. Provide a transparent segment on the waste discharge piping so that the waste flow can be viewed as discharged.
3. For water softeners removing very high levels of hardness, evaluate installing a non-treated water faucet at the kitchen sink to allow reduced exposure to the treatment chemical.
4. For a water softener this would allow water with lower sodium level to be available at the kitchen sink. Have faucets that will allow sampling of both raw water and treated water, and place a faucet between each treatment component.
5. Install a water meter so that the longevity of each treatment function/cycle can be more accurately estimated and the media replacement duration or rejuvenation interval can be precisely determined.
6. Place the device in a well lighted, heated area where repair access is good.

Where cost is not prohibitive and where health factors are being addressed, consider the appropriateness of two devices installed in series. The first would remove the "majority of the contaminant," and the second would "polish" and address "breakthrough" and "dumping" of the contaminants. Once the first tank is rejuvenated, the plumbing would be revalved such that the lead and lag roles of the two treatment tanks are reversed.

OPERATION OF TREATMENT EQUIPMENT

1. Make multiple copies of the operational instructions and store in secure locations.
2. Sample treated water periodically to ensure high treatment effectiveness.
3. Sample raw water occasionally to determine the severity of the contaminant concentration and whether the contaminant type(s) have changed.

THIRD PARTY TESTING AND PROFESSIONAL ASSOCIATIONS

National Sanitation Foundation International (NSF) is a third party entity that carries out a

certification program for various types of home water treatment devices. ANSI is the American National Standards Institute. Their categories of certification include:

Standard Number	Category Name
NSF/ANSI 42	Drinking Water Treatment Units - Aesthetic Effects
NSF/ANSI 44	Cation Exchange Water Softeners
NSF/ANSI 53	Drinking Water Treatment Units - Health Effects
NSF/ANSI 55	Ultraviolet Microbiological Water Treatment Systems
NSF/ANSI 58	Reverse Osmosis Drinking Water Treatment Systems
NSF/ANSI 62	Drinking Water Distillation Systems
NSF/ANSI 177	Shower Filtration Systems - Aesthetic Effects
NSF Protocol P231	Microbiological Water Purifiers

This certification includes testing of the devices and inspection of the manufacturing facility. Before purchasing any equipment you may want to check for the NSF certification. These NSF protocols have differing goals depending on whether the treatment process targets a health or aesthetic contaminant. Certified products bear the logo "Independently Certified, NSF."

The **professional trade group** of the private home water treatment industry is the Water Quality Association. You may also want to look for their membership seal and whether the employees of the local installation firm have been certified and at what complexity level. There are five complexity levels.

NSF International

3475 Plymouth Road, Box 130140
Ann Arbor, MI 48113 0140
(313) 769-8010
www.nsf.org/certified/dwtu/

Water Quality Association

4151 Naperville Road
Leslie, IL 60532-3696
(630) 505-0160
www.wqa.org

The Water Quality Association has developed the "Gold Seal" program to help identify superior water treatment equipment. The certification categories include:

WQA S-100: Household and Commercial Water Softeners
WQA S-200: Household and Commercial Water Filters (In-line)
WQA S-300: Point-of-Use Reverse Osmosis Drinking Water Systems
WQA S-400: Point-of-Use Distillation Drinking Water Systems

State Certification of Equipment

New Hampshire does not certify water treatment equipment. However certain other states do conduct such certification. Listed below are some state certification programs:

California www.dhs.ca.gov/
Iowa (515) 281-8772
Wisconsin (608) 275-3226; (608) 275-3294

DEVELOPING ANOTHER WATER SUPPLY

When a single well has many water quality problems requiring different treatment components, evaluation could be given to abandoning that water supply source in favor of another. Alternatives could include a new well in a different strata or extension of a public water system.

New Well. If considering the new well option, evaluate changing from a bedrock well type to a sand and gravel well or vice versa. To judge the likelihood of success of the new well option, evaluate similar wells on other nearby properties. If the building lot is small, contaminants are extensive, or soils and water table levels are unfavorable, an alternate water supply well on your property may not be feasible.

Extension of Municipal Water Service. Where there are many water quality problems and many homes with such problems, consideration could be given to seeking an extension of a public water system, where available. Such an effort is typically expensive and has many administrative challenges. Public water also provides fire hydrants and forever simplifies water supply for the property. Municipal water extension is typically judged to be worth the extra effort and expense. Please see fact sheet WD-WSEB-6-7 "Proposing to Extend Town Water Service" for more discussion.

To address high expense, financial assistance could be requested from:

- The town's voters at town meeting.
- The Rural Utility Program of the U.S. Department of Agriculture.
- The Community Development Block Grants (CDBG) program through the Office of State Planning.
- State Revolving Loan Program (SRF) through the Department of Environmental Services.

Please reference fact sheets WD-WSEB-17-1 and 17-3 for information on these funding programs. In addition, financial assistance could be sought from large nearby land owners whose properties would be improved by the availability of a public water supply.

FOR MORE INFORMATION

For more information you may contact the DES Water Supply Engineering Bureau at (603) 271-3139. We would appreciate your comments concerning this fact sheet and your experiences in purchasing water conditioning equipment. For an overall listing of water supply related fact sheets, please request WD-WSEB-15-2. Drinking water fact sheets are available through the DES website at: <http://www.des.nh.gov/ws.htm>. Please check the internet annually for updates to this document. 09/05